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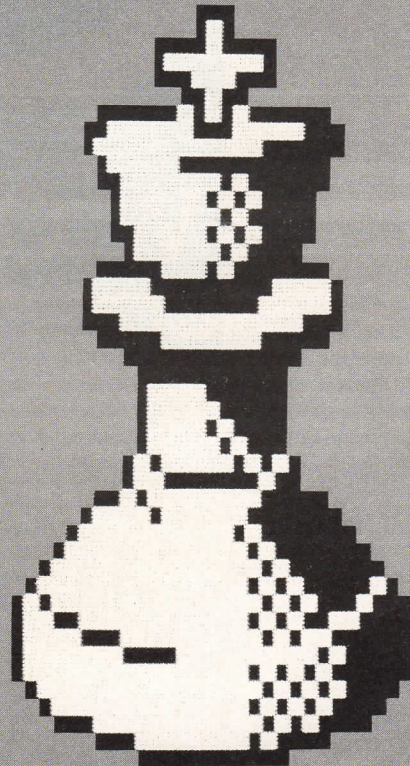
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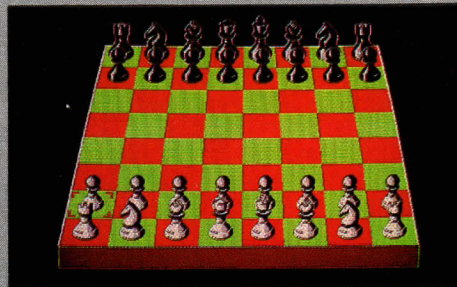
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We review some of the latest books which have been published to help you improve your QL computing. Page 21



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BUSINESS SOFTWARE

Whether it is for accounting use or horticulture, there is a QL application to suit your requirements. Shrub Database and Planner and QL Integrated Accounts are examined. Page 24

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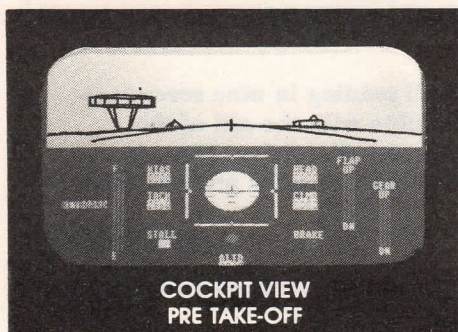
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QL FLIGHT SIMULATOR

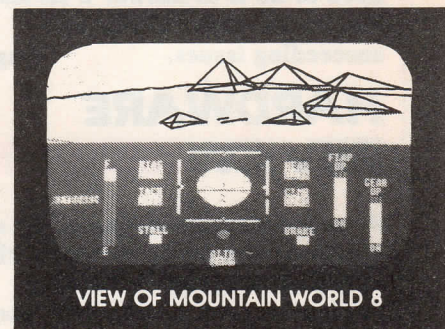
Not a game but a real full feature flight simulator for the Sinclair QL written by an Aeronautical Engineer for pilots and student pilots alike. QL Flight (QLF) is a view orientated flight simulator which means you can actually view your surroundings. First set up the weather in each of the nine worlds selecting wind speed, wind direction and cloud ceiling. Select your starting world then your QL moves to the cockpit view!



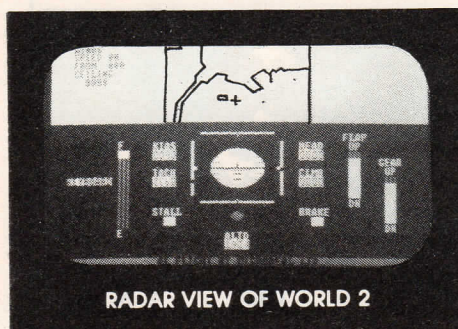
**REALISTIC
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AGAIN**



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Answering service wins

THE Micro Peripherals disc drive competition for which Micro Peripherals provided one of its disc drive outfits as a prize to the person who could tell us the most interesting use for a QL disc system was won by Warren Evans, who told *QL World* in his entry:

"My name is Warren Evans. I am 40 and suffer from a progressive form of muscular dystrophy. As there will be a time when I can no longer go to work, it seemed sensible to find a need for an answering service such as they have in the U.S.A., where when the client is not able to take telephone calls, they are diverted to the answering service, where they are answered by live people."

Evans added that he hopes to use the system to catalogue the calls and any messages left for clients but also to relay messages by modem to clients who have QLs. For the service to be successful, he will need a fast and reliable disc storage system

which can hold large amounts of information.

"My aim, if successful, is to make the system available to other house-bound disabled people and get agencies all over the country, making as many as independent as possible," he wrote, "but as I am also the chairman of the Hemel Hempstead branch of Muscular Dystrophy, you will be assured that, succeed or fail, the disc drives would still be put to good use in the day-to-day running of the branch."

Finding a winner among the vast number of worthy entries was difficult and we have nominated a series of runners-up who will receive discounts on Micro Peripherals disc drive equip-

ment. The runners-up will be featured in following issues of the magazine.

The other big winner in our latest round of contests is Paul Ambler of Royston, Herts. Ambler won our communications competition, entitling him to one year's free subscription to Micronet and a free Tandata communications system to access the service.

Ambler's name was drawn from among the readers who guessed correctly that Alexander Graham Bell called his assistant Watson with the words "Come here, I need you"; that the writer of "East is East" we were seeking was Rudyard Kipling; and that Sysops are bulletin board system operators.



Astrology program

PALM-READING and fortune-telling is not something you normally associate with computers but it can now be associated with the QL. Digital Precision is offering *QL Super Astrologer*, a £24.95 astrology program which claims it can do definitive character reading and personality delineation. The machine-code program was apparently produced as the result of collaboration between a professional astronomer and an astrologer.

The program takes account of birth date and time, as well as location. It claims to produce a fast and detailed readout, chronicling your future — and present — with precision. The influence of the astronomer on the program is also evidenced by the non-astrological features, such as eclipse calculator, display of solar system with exact planetary positions at any time, and a distance-from-earth calculator.

The program can be customised by experienced programmers, whom Digital Precision invites to modify the horoscope text files contained in the code.

Interface system

CUMANA, the company which long ago promised to be the first to produce O/S-9 for the QL, has produced a disc system for the machine. The Cumana interface and disc system, reviewed in the peripherals section of this issue, joins the growing army of alternative storage systems for the QL.

The interface connects directly into the QL expansion socket and, unlike some other systems on the market, offers signal buf-

fering on the bus between the QL and the disc interface to achieve complete data integrity.

It includes ROM-based utilities and a resident print-spooler system. The interface will support up to four drives in double-density mode, and uses 3in., 3.5in., 5.25in. drives.

The interface will sell for £82.95 including VAT and the company is offering a complete disc set-up, with 720K 3.5in. drives and interface, for £279.95.

Group for C users

WITH C COMPILERS now available for the QL it should be no surprise that efforts are being made to establish a U.K.-based C users' group.

The group will be organised, initially at any rate, by Leon Heller, chairman and co-founder of the QL users' group, Quanta.

The group will be organised along the same lines as Quanta — non-profit-making, with democratically-elected officers.

Its main activities will be the production of a bi-monthly newsletter and the maintenance of a software library in source code form, on 5.25in. double-sided 40-track discs, probably IBM PC format.

Details are available on receipt of a SAE from Leon Heller, 8 Morris Walk, Newport Pagnell, Bucks MK16 8QD.

Hard disc expansions

CST has announced more details of its range of hard disc expansion systems for the QL, previewed in *QL World* Issue 3. The hard disc units are now available in a range of configurations — 10, 20 or 40MB Winchester options, together with one or two 3.5in. 720K floppy disc drives.

Prices for the system start at £1,100, for which there is a 10MB hard disc and hard disc controller. An additional £150 will add a single 3.5in. 720K floppy to the system, while a

20MB system instead of 10MB will cost £1,500. The top-of-the-line system is the 40MB model with twin floppy disc drives, which will sell for £3,000.

As Winchester discs are likely to contain a huge amount of information, a sophisticated data management utility is provided free with every system to allow simple back-up of data on to either floppy disc or Microdrive, if you can tolerate the waiting time. To accommodate the extra hardware, the company has designed a multi-port expansion

module for the QL. The £170 CST expansion contains four fully-buffered QL expansion ports in a case.

CS claims that each port is physically compatible with the QL internal expansion port and no dismantling of the QL is required to install the system. The company has also made an effort to ensure that the system will work with all versions of the QL operating system. The unit contains a ROM which ensures functioning with any version of the QL operating system.

SUPERCHARGE SUPERBASIC COMPILER



- ★ This amazing compiler translates QL SuperBasic into 68008 machine code, completely automatically! It supports the entire syntax of SuperBasic (except, obviously, commands like EDIT/LIST/RENUM which are specific to Basic and would be meaningless in machine code). That means all file handling, multidimensional arrays, procedures (with parameters too), local variables, strings, sound, graphics, separate superspeed integer, floating point arithmetic (displaying Nine Digits of Precision versus The Interpreter's Seven!), extensions to Basic, the complete range of SuperBasic control constructs . . . refer to your QL User Guide for the whole list!
- ★ The code generated by Supercharge runs incredibly fast – here are the standard PCW benchmarks (PCW June 1984) for QL Basic compared with the timings for the same programs when Supercharged:

BENCHMARK NUMBER	1	2	3	4	5	6	7	8
SUPERBASIC (SECS)	2.1	6.4	10.7	10.3	13.2	26.1	61.8	25.8
SUPERCHARGE (Floating Point) (SECS)	0.2	0.3	1.2	0.9	1.0	2.5	4.1	8.6
SUPERCHARGE (Integer) (SECS)	0.06	0.1	0.3	0.3	0.3	0.7	1.0	N/A

(Variations will exist between different QL systems)

Hence on standard benchmarks a 60x speed increase is possible . . . SUPERCHARGE, however, is at its least impressive when compiling such short programs, as SuperBasic grows slower as program size increases. Speed improvements of **SEVERAL HUNDRED TIMES** are in no way uncommon when using SUPERCHARGE on programs of average size.

- ★ SUPERCHARGED programs are independent jobs (so you don't need to have SUPERCHARGE loaded to run them).
- ★ SUPERCHARGED programs are relocatable and are inherently multitasking (so you can run any number of them at once).
- ★ SUPERCHARGE optimises as it compiles – and the advanced user may switch the optimisation from time to space on a line by line basis.
- ★ SUPERCHARGED programs load far more quickly (at least 5-10 times) and, hence reliably, than normal SuperBasic – there is no pause between blocks
- ★ SUPERCHARGE can compile programs of ANY size, provided you have enough RAM on board (for the unexpanded QL, the limiting source code size is still a massive 40K!). Compilation listings can be directed to any device – and a complete set of compile/run time error messages (clear and unambiguous, unlike the Interpreter's!) are issued, showing exact error positions.
- ★ Add-on commands, functions and procedures are allowed by SUPERCHARGE, provided they do not read/alter Interpreter data structures . . . Hence utilities supplied with disk systems and QL Toolkits will work with SUPERCHARGE!
- ★ SUPERCHARGE is compatible with all disk and memory-expansion systems. The system we recommend (on grounds of quality, speed and reliability) is the one we used in developing SUPERCHARGE – the CST disk system, available from Computamate (Scotia Road, Burslem, Stoke-on-Trent – Tel: 0782 811711) or from us – write in for details.
- ★ SUPERCHARGED programs are protected against unauthorised modification/listing/tampering – permanently.
- ★ SUPERCHARGE is the only QL Compiler which offers the user the convenience of interactive testing, editing and debugging.
- ★ SUPERCHARGE cures most bugs and lifts many of the restrictions imposed by the Interpreter! Examples of problems completely cured under SUPERCHARGE: "Too many parameters in a procedure" bug; the RESPR bug, GOSUB in a single-line FOR statement, CALL in long programs, procedure parameters/integer/string variables used in SELECT statements, full integer arithmetic, etc, etc.
- ★ SUPERCHARGE adds a number of new commands to SuperBasic, including ones to monitor device statuses, to list/stop/remove tasks, to change task priorities, and so on.
- ★ SUPERCHARGE is supplied either on disk or microcartridge and can be easily transferred/backed up from one to the other.
- ★ SUPERCHARGE is supplied with a superb Instruction Manual (40,000 words) designed to complement the User Guide – it is designed for both beginner and advanced user, with sections on "Getting The Best From SUPERCHARGE" and many examples.
- ★ SUPERCHARGE itself loads and runs phenomenally fast – yes, SUPERCHARGE is itself a SUPERCHARGED program!

£59.95 COMPLETE WITH DETAILED MANUAL (specify cartridge or CST diskette)

Author: Simon Goodwin. Assistant: Gerry Jackson. Mission Control: Freddy Vachha.

NOTE: Software houses requiring to use SUPERCHARGE will need a site licence, for which the VAT-inclusive cost is £250 (in addition to the price of one compiler). Instructions are supplied to site licence holders on the making of appropriate numbers of copies of SUPERCHARGE for their exclusive use. Site licence holders are exempted from paying Digital Precision royalties on SUPERCHARGED programs.

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COMPETITION

WIN A QL PRINTER WITH QL WORLD

Sinclair has now started despatching its new QL printer to the shops and *QL World* has negotiated an opportunity for you to obtain one free. In the next three issues of *QL World*, you will be given details of this exciting new printer competition.

This month we provide exclusive and detailed background about the printer and set the first three of 10 questions you will have to answer to have your chance of winning.

The printer is a re-designed Seikosha printer with special Sinclair software built in so that it can handle the full Sinclair character set. It includes a serial interface and plugs straight into the QL using a standard cable. Tractor feed or friction feed can be used to pass paper through the printer.



If you do not win the printer in the competition, it will cost £249 including VAT. Sinclair says the printer should be available from most Sinclair stockists and should be compatible with most QL software.

The printer is styled in QL black. It is only 390mm. wide, 119mm. high and 266mm. across and weighs less than five kilogrammes. Specifications suggest that the printer ribbon should last for at least 2.5 million characters, typically 800 pages of solid text.

Now that you have the information on what the printer does, you will want to know how to win it. All you have to do is answer 10 questions about the QL and send the entry form, which will appear in *QL World* Issue 7.

For the time being, prepare your answers to the following three questions. Do not send anything until you have the form printed in Issue 7. You must collect issues five, six and seven to enter. Here are the first questions:

1. What is the name of the main character in the *QL Cavern* arcade game?
2. The Psion *QL Chess* won a major computer chess championship in 1985. Which Russian player won the recent world chess tournament?
3. How many computers were launched by Sinclair Research before the QL?

Your comprehensive guide for

THERE WILL by now be all too few shopping days to Christmas and you will probably be confused as to what to buy for your QL — or, more to the point, what to ask other people to buy you for your QL for Christmas.

Your first answer is likely to be a disc drive but disc drives are the kinds of things which do not look spectacular under a Christmas tree; once you plug them in they either work or they do not and there is not much added excitement — apart from the odd increase in speed, extra commands in SuperBasic, the ability to access far more programs immediately, the enhanced reliability, the potential of reading text files from other disc formats — from using a disc-based QL. Well, anyway, we are not going to talk about disc drives here.

The real high-ticket goodies most people will be seeking this Yuletide are likely to be printers and monitors. After all, a QL is not much use for business without a printer and it cannot be relied on for instant access if you have to fight with the rest of the family every time you want to connect it to the TV set.

Which choice?

We have set out a game plan for choosing a monitor and a printer, with reviews of some of the more popular makes of both, along with an exclusive preview of the new Sinclair-brand printer, which you have a chance to win in the competition in this issue, and comparative tables. Jason Ball begins the investigation with a report on how to buy a monitor.

Each weekday morning as the QL surges into life I am faced with the external question, monitor or TV? The TV, represented by function key two, must surely be inferior to a monitor but many people cannot justify the cost of a screen dedicated to a QL.

The video display of the QL is rated among the top three in the PC market, with 32K devoted to screen handling. A normal television set cannot support the 512×256 pixel display, particularly with its 85-column text format, which is too wide for some monitors.

Unfortunately, the 40-character F2 mode designed for television sets is rarely used in commercial programs; even the Psion programs provided with the QL — QL Quill, Archive, Abacus and Easel — run best in hi-res mode. The poor quality of a TV picture and lack of anti-glare faceplate increases eye fatigue, while the poor colour, video signal drift and flickering characters are annoying.

For many, there will also be complaints

from those who would rather watch News at Ten than a crawling word-processed letter to the bank manager.

Having decided that come hell or high overdrafts you need a new screen, the question arises what type, and for how much? There are three choices. First on the list is the monochrome — single colour — monitor, which is by far the cheapest. Second, there is a small selection of TV/monitors available, representing good value but lacking in video picture quality. The final option is to go all the way to a colour monitor, at prices three or four times those of monochromes.

The discerning business owner may well have selected the QL for its comparatively low price, so a monochrome monitor is a sensible choice. The business software supplied with the QL is designed to be used with monochrome or colour monitors and the high resolution of monochromes is well-suited to the 85-column text mode.

The only disadvantage with monochrome monitors occurs when the 40-column mode, which offers a higher number of colours, is used, since colours of similar intensities are difficult to distinguish. That mode, however, is seldom used in business and serious applications programs. The screens on monochrome monitors are rarely black and white and tend instead to be green or amber. Experts in screen ergonomics are not entirely agreed on which monochrome screen type is best, so it is for you to select the one which is easiest on your eyes.

Best value

Alternatively there are a few monitor/TV displays on the market which accept RGB input from a video source such as the QL. Bear in mind that they are only modified television sets, so their resolution and clarity of picture does not equal that of a true monitor. They are, perhaps, the best value, since a television set is included in the price — you can amuse yourself while the Micro-drives take their time loading.

Finally, there are the true colour monitors. They are the most popular choice for QL owners wanting to make full use of the capabilities of the computer but they are also the most expensive. Most monochrome monitors have a resolution high enough to cope with the QL but colour monitors do not normally have a high enough resolution to handle the QL 85-character hi-res screen mode.

That limits your choice to a certain extent but the 85-column monitors available are of excellent quality. It is again a question of personal choice; ironically, the games player most justifies a colour monitor but seldom has the money to buy one.

Having decided on the type of monitor to suit you, the search begins for something suitable at the correct price. There are several features you should look for when buying a monitor; the most important is quality of picture.

Screen flicker is a recognised hazard often associated with TV/monitors and should be carefully avoided. Anti-glare faceplates are essential to prevent unwanted reflections and reduce screen brightness. If those two are not considered, the result will be considerable eye-strain and subsequent headaches.

Anti-glare devices

Anti-glare devices are of two types, either the same shape as the screen — held a few millimetres from it inside the monitor case — or as a flat piece of glass held on the front of the case. The screen should be bright — not glaring — and the contrast or colours should be crisp and well-defined. Be sure to check the monitor with a QL; the screen surround often hides corner characters in 85-column mode, so monochrome monitors in particular must have a horizontal picture width adjustment to prevent that.

There must be plenty of variation on the controls, which should include brightness, contrast and image movement. That allows you to adjust the screen to suit effects created by different programs. Also should the tube start to fade in several years, more variation of the controls will permit you to maintain a clearer picture for longer.

The monitor should have an RGB and/or TTL input with a bandwidth of at least 18MHz. Tube resolution varies according to manufacturers' interpretations, so the best method is a close look at the screen.

Measure the height of the screen; there is nothing worse than a monitor propped on books so that the bottom line is visible above the QL. Since the case will not support a monitor, the screen must, if possible, be tilted upwards to the face of the operator from desk level. The best solution is a monitor stand, sometimes provided with the monitor.

Personal preference will attract people to the shape of a monitor but some points are worth noting. The tube tapers to a point behind the screen, so the monitor need not be box-shaped. In fact, the sleek lines of the QL are better matched by a curved monitor, preferably black in colour, which is not too heavy in appearance.

There are no monochrome monitors labelled for the QL and of the colour monitors configured to the QL the official version is not necessarily the best. The Vision QL was simply sponsored by Sinclair and sev-

monitors and printers

eral other monitors could have had the QL emblem bestowed on them.

To see what is on offer, we looked closely at a few monitors which might be considered for use with the QL. The specifications of most colour monitors leave characters missing from the edges of the screen. The three monitors we examined were the Microvitec 1451/DQT3 or Cub for short, a Sanyo monitor which played a major early role in publicising the QL, and a Fidelity TV/monitor which has proved a popular choice.

The Cub is an excellent monitor, completely flicker-free, and intense both in colour and clarity. Renowned for its success in the educational field with monitors for the BBC micro, Microvitec has developed a fully-compatible black plastic monitor for the QL. Complete with an all-position stand, the Cub has a sloping top and a single brightness control behind the front cover. Screen width is 14in. — about average for monitors — and the input is RGB/TTL to suit the QL.

Horizontal tube resolution is 653 pixels, more than most other monitors in the same price range, and perfect for the QL hi-res modes. Bandwidth is 18MHz and the anti-glare CRT is built into the cabinet.

The Sanyo colour data display monitor was widely-used by Sinclair to demonstrate the QL at all the shows which took place six

months after the launch of the machine. At first I was disappointed with the picture on the Sanyo but having wiped the dust from the screen, a bright clear picture emerged.

The colours were not so light as those of the Cub monitor, but by comparison the Microvitec screen was almost garish. No flicker was noticeable on the Sanyo monitor but the 85 columns only just fit on to the screen. An assortment of controls appear beneath a front cover but only two improve the screen — the brightness, when full, and the H-Center used to fit the QL picture within the screen limits.

Comparison

After having looked at the two dedicated monitors, the prospect of a colour TV in the office attracted addicts from all corners to watch the afternoon tennis. Instead they saw a simulated version of the real thing, the Psion *Match Point* running on the QL. Before the Fidelity CTM1400 was taken over for TV viewing, I managed to compare it to the true colour monitors described earlier.

The Fidelity certainly looked smart enough, with a flat anti-glare glass screen on the front and a tapered plastic back. Input for the video source is through a Euro-connector socket, which allows RGB and composite video inputs with a separate audio

Picture quality was not bad at all — not as clear as a colour monitor but far superior to a normal television set. The contrast and brilliance controls were essential; unless the brilliance is set at minimum, characters tend to throw their shadow across the screen and contrast is weakened. Colours are good but not as intense as true monitors and there is a hint of screen flicker.

Unfortunately for QL owners, no TV/monitors seem to be designed for use with 85 columns, so again the left-hand edge of the picture is lost. If you can live with that, the TV/monitor is the best option for the leisure user who cannot afford a true monitor.

My notes complete, I settled to watch another tantrum on the Centre Court and noticed the exceptional quality of the television picture; perhaps it is the higher resolution. Take note — the computer must be switched off when watching television or it interferes with the signal.

Having studied the three monitors, it became evident that shape and size were attractive but, so long as the screen was clear, the picture choice was a matter of preference. A TV/monitor would not be the best choice if you intended to do a great deal of 80-column business work with the machine. For a greater selection of monitors, see table one, which lists a variety of dis-

Continued on next page

Table 1. MONOCHROME MONITORS

Make/model	Price	Contact	Details
Citadel 101	£79.93	01-951 1848	12in. green screen.
Phillips BM 7502	£86.25	01-658 6350	12in. green screen. Good picture on QL. Amber screen available
Ferguson MM 02	£80		12in. monochrome. Good specifications.
Hantrex Boxer	£99.95	01-778 1414	12in. green screen.
Citadel MVM 12G	£102.93	01-951 1848	12in. green screen.
Texan	£114.94	01-658 6350	12in. green screen. Swivel base available.

COLOUR MONITORS

Microvitec 1451-DQ3	£269	0274 390011	14in. RGB/TTL. Tilt stand available. Resolution 653 x 585 14in. screen includes tilt and swivel plinth.
Sanyo	£314.64	01-658 6350	14 in. RGB.
MBS Vision QL	£299	0990 28921	12in. RGB.
Opus 1302-2	£199.95	0737 65080	14in. RGB.
Centel	£299	0274 390011	14in. RGB. Good picture.
JVC	£299.95	01-701 8668	14in. RGB/TTL. Resolution 580 x 470.

COLOUR TV/MONITORS

Make/model	Price	Contact	Details
Fidelity	N/A	N/A	14in. RGB/composite. Automatic switching for permanent connection of QL. Has anti-glare screen. Does not take 85 column.
Phillips CT 2006	£253	0923 777155	14in. RGB. Copes with 85 characters. Medium resolution — remote also available.
Phillips CT 2016	£266.80	0923 777155	16in. RGB. Supports 85 columns. Medium resolution — remote also available.
Ferguson TX model MC01	N/A	TV retailers	14in. RGB/composite. Automatic switching for permanent connection of QL. Optional 12/24V battery adaptor. Does not take 85 column.
QL 14	£195	04215 66488	14in. RGB. Full 85-column width. Matt black livery. Identical to Fidelity TV/monitor but monitor only. Supports 85 columns.

Table 2.
MATRIX PRINTERS

Make & Model	Price	Matrix	Speed	Paper	NLQ	Hi-res	Par	Ser	Comment
Samleco DT 80	£115	11 x 9	30	F		*	*	0	Cheapest
Brother HR 5	£160	9 x 9	30	F		*	0	0	Good value
Seikosha 100A	£228	5 x 7	30	P/F			*		
Seikosha GP-100VC	£228	5 x 7	50	P/F			*		
Shinwa CTI CPA-80	£228	9 x 13	100	T/F		*	*	*	QL version £286
Walters WM80	£228	7 x 8	80	T/F		*	*	t	
Shinwa CP80	£229	13 x 9	80	T/F		*	*	t	
Centronics GLP	£230	9 x 9	50	T(t)/F	*	*	*	*	
Smith Corona D100	£253	9 x 9	120	T/F		*	*	t	
Seikosha GP-250X	£270	5 x 7	50	P/F		*	*		
Riteman C +	£287	9 x 9	105	T(t)/P/F	*	*	*	t	
Mannesman Tally 80	£299	9 x 7	80	T/F				*	
Riteman Plus	£299	9 x 9	120	T(t)/P/F	*	*	*	t	
Riteman F +	£316	9 x 9	105	T(t)/P/F	*	*	*	t	
Epson RX-80	£320	9 x 9	100	T		*	*	t	Cheapest Epson
Canon PW 1080A	£366	11 x 9	160	T/F	*	*	*	t	Good value. Epson comp.
Epson RX80-FT	£366	9 x 9	100	T/F		*	*	t	As 80 with F feed.
Smith Corona	£402	9 x 9	160	T/F	*	*	*	*	Quality at a price.
Walters WM2000	£454	9 x 9	125	T		*	*	t	Heavy duty.
Centronics H80	£457	11 x 9	160	T/F	*	*	*	t	
Canon PW 1156A	£458	11 x 9	160	T/F	*	*	*	t	Wide type of 1080A.
Epson FX-80	£503	9 x 9	180	T		*	*	t	

Continued from previous page

plays at various prices and specifications. Once you have decided which display someone will be buying you for Christmas, you might want to become even more hopeful and ask for a printer. After all, you do not want to have to post your QL and monitor every time you write a Christmas thank-you letter using the Quill word processor.

A printer will allow letters, programs, spreadsheets, pictures, diagrams and almost anything else you devise on the screen to be preserved on paper. Bear in mind that printers are not glorified typewriters without

keyboards; their methods of printing use advanced technology of a completely different nature to most typewriters. They are designed to give a wider range of features than a typewriter and many can reproduce graphics as well as print.

The vast selection of printers on the market can be divided into five categories, the cheapest and most popular of which is the standard dot matrix. Dot matrix printers, as the name suggests, use a matrix of pins, usually eight wide and eight high, to print text and graphics. The pins are fired at the paper, pressing the ribbon against it and

printing the character. Different characters and graphics are created by firing different pins at the paper.

That enormous flexibility in the shape each character may take means a wide range of character sets may be used, as if changing the type-face on a modern typewriter, or you can design your own character sets.

The traditional disadvantage with dot matrix printers has been their comparatively poor quality of print, particularly when producing text. The dots which make up each character were clearly visible but the characters are not as dark or well-defined as typewritten text. Many cheaper dot matrix printers did not offer true descenders, i.e., they could not print the tail on letters such as p, g and y, so the letter is moved up, which can make it difficult to distinguish from a capital letter.

All that has largely changed now, with the advent of higher-resolution modes on most printers which allow you to produce better print.

Most popular

Dot matrix printers are the quickest and cheapest method of printing available to home computer users and are also the most popular. Despite recent advances in dot matrix technology, the standard dot matrix printer is not yet the best choice for people using the QL for business letters or reports, although it is still the ideal type for home users and computer buffs, who tend to produce long program listings and will appreciate their accuracy, speed and graphics capabilities.

The best-selling dot matrix printers are produced by Epson, which has set a standard in the lower-priced dot matrix market, just as IBM has set the standards for most PCs.

The next step upwards in price and quality from the standard dot matrix printer is the NLQ — near letter-quality — printer. Again, it uses a dot matrix and acts exactly like any other dot matrix printer. The print head contains a greater number of pins than normal, so producing a much clearer character image. That in turn is enhanced when in NLQ mode by printing each character twice, the second time slightly offset from the first, so the character is darker and the dots are less visible.

Most users will find that type of printer is the best alternative, since it has all the facilities of a dot matrix printer, as well as good text representation. For the business user, or your letters to the bank manager, the quality is still not good enough in comparison with a typewriter or letter-perfect printer and NLQ mode is much slower than normal.

The most common type of letter-quality printer is the daisywheel. It is similar to most modern typewriters, although many still use a golf-ball or the old-fashioned arms to press characters against the ribbon. The daisywheel is a circular fan with a character on the end of each blade. That is held in the printer and rotated until the appropriate character is at the top, at which point a bolt strikes it from behind against the ribbon.

The quality of print is really not comparable with that of a dot matrix printer, since each character is pre-defined. Also, while there is a wide variety of print faces available, each on a different daisywheel, they can cost in the region of £10-£20. Remember that the daisywheel printer cannot produce any kind of graphics and the print from a daisywheel may be slightly different from that on the screen, so it is not suitable for program listings.

When choosing a letter-quality printer, bear in mind that many electronic typewriters can also be used with the QL, particularly the modern daisywheel types, so long as they have a compatible interface. Business users may find it more sensible to buy a typewriter, since they can be used when your QL breaks down. It is also easier to type labels and forms with a typewriter, since you can see where each character will be printed on the paper, and typewriters are not much more expensive than printers.

Speed disadvantage

A major disadvantage with daisywheel printers is their speed. Most dot matrix printers can achieve 50-150cps but daisywheel printers work at 10-25cps and typewriter/printers are even slower.

There is one aspect of which none of the printers already covered is capable — colour. For that luxury there are only a few printers in the lower price range and they are of two types — dot matrix with multi-coloured ribbon and ink-jet technology.

The dot matrix colour printer uses a ribbon of four colours — yellow, magenta, cyan and black. They are used to produce up to seven colours by printing one colour over another. They can also behave like a standard dot matrix printer with its various typefaces but their small matrix means NLQ is not possible. Unfortunately, because ribbons are used, the colours are sometimes of poor quality, with no brilliance, and the ribbon-changing makes the printer extremely slow.

The alternative to dot matrix for colour is the ink-jet printer. Using bags of different coloured inks, it squirts the inks on to the paper to give excellent colour results. It is much faster than the matrix printer but the

jets are poor at reproducing text, even in comparison with the dot matrix, so this type of printer is almost useless for quality reports or letters.

It has the advantage of being slightly cheaper than multi-ribbon systems and the colours are much brighter, intense and even. That will suit the user who wants predominantly colour graphics and not text.

Our final category of printer is not really for the QL owner but more to demonstrate the lengths to which you can go in your quest for perfect print. Laser printers retail at £3,000-£6,000 and closely resemble a photocopier. They are capable of text and graphics — not colour yet — at a standard approximately equal to that of typesetting. Unfortunately, to make full use of such a machine a computer vastly superior to the QL is preferable, since the printer resolution is greater than that of the computer.

Having decided the type of work or leisure for which you will use your printer, and so the type of printer to buy, there are some points to consider as you look into various makes.

The obvious temptation when choosing a printer is QL compatibility. The QL is built with two serial RS232 ports at the back, so printers should have that type of interface. It is possible to use the computer with a parallel Centronics printer but an extra interface must be bought for about £30.

While any printer with one of those interfaces will work with the QL, each must have its own printer driver before it can be used properly. It is therefore worth considering printers for which drivers are already provided; the Psion programs list the Epson FX80, Diablo, NEC P3, Qume LP20, Smith Corona, Brother HR15, SPG 8010 and the OK Writer.

Table 2. DAISYWHEEL PRINTERS

Make & Model	Price	Speed	Paper	NLQ	Hi-res	Par	Ser	Comment
Smith Corona TP1	£235	17	F			*		
Daisy Step 2000	£332	16	T(t)/F	t		*		Good value.
Dyneer DW16	£378	16	T/F			0	0	
Silver Reed EXP	£378 500	12	T(t)/F		*	t		
Brother HR 15	£445	13	T(t)/F	t	t	0	0	Good value. All features.
KDC WP550	£458	14	T/F	t		*	*	All features at a price.
Turbo 20	£458	18	T(t)/F	t		0	0	
Juki 6100	£459	17	F			*	0	

Key:

T - Tractor feed. P - Pinfeed. F - Friction feed. t - Costs extra. 0 - Optional.

If you buy a printer for which you need to create a printer driver, check the standard of the printer manual, which must give explicit technical details — in particular the control codes — to use all its features. Having found a printer, there are certain points you should check before committing yourself.

First, there is a question of speed. Manufacturers, I assume, send several thousand volts through their printers just as they measure their CPS ratings, since they are invariably higher than the true printer speed. The classic example is a dot matrix colour printer from Epson which boasts of its 160cps mode but fails to tell you that in some circumstances the print speed is about 2.5cps, so check the speed before you buy.

Print quality

Print quality is another consideration. With dot matrix printers that depends on the number of dots in the matrix, although there is no substitute for comparing the print on paper.

Another important consideration, particularly for business users, is the printer carriage width. That may need to be longer than normal to accommodate spreadsheets and graphics, so check if a wide version of the printer you choose is available. You may also require a cut-sheet feeder to avoid entering each piece of paper manually, so make sure the printer has one made for it.

Also check the type of paper feed used; the two types are friction feed for single sheets or paper rolls, and pinfeed/tractor feed, which requires special paper with perforated edges. The pinfeed mechanism should be avoided, since it cannot be adjusted for different paper widths — as can the tractor feed — and it tends to screw up in more ways than one.



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BIRTHDAY AWARDS

Nominate your QL choices

THE QL is approaching its second birthday. In January, it will have been 24 months since Sir Clive Sinclair launched the machine to the collective expressions of surprise of the world's computer press. As the QL user community collects the celebratory left-overs from Christmas in preparation for this QL anniversary, we at *QL World* look back on the last two years, with particular concentration on 1985, the year in which the QL has really come into its own.

You will see a panel with this article giving the views of a reader who felt he needed to commit his experiences to paper.

The year 1985 began with the first major shipments of disc drives for the QL and the announcement by large numbers of companies that they were either developing or about to release RAM expansions, business software or printer interfaces for the machine. Publishers, too, played an important role at that point by announcing the release of large numbers of books about the machine. They were the second wave of releases, if you like.

By springtime, the big news was that Psion Version II software had finally been released and shipped. For QL Quill users, who had long experienced slow Microdrive loading, limited file sizes and troublesome import-export commands, that was a particular relief.

Event of the year

It was also at that time Sinclair announced that limited QLUB membership would be offered free to all purchasers of the QL who returned warranty cards to the company. With the advent of the free QLUB membership was the announcement of a £35 blanket fee for a one-time update of Version 1 Psion software to Version 2.

Then, of course, followed the event which most affected us, the launch of *QL World*, the new magazine for QL users which offered six free issues and set a new standard for publications about the machine. *QL World* was launched at about the time Sinclair announced a massive reduction in the price of blank Microdrives, lowering the figure from £4.99 to £1.99.

Despite all that activity, sales of the QL were nowhere near as healthy as Sinclair had hoped. The company was short of cash and in late June announced that it was to be taken over by *Mirror* publisher Robert Maxwell.

On the heels of the takeover announcement followed the news that the Sinclair Metalab had made a major commercial breakthrough in silicon chip wafer scale

integration technology. Maxwell suggested proudly that his new company had something IBM would give its eye-teeth to have, while Sir Clive protested quietly that perhaps the WSI technology was not included in the takeover bid.

Things at Sinclair became very quiet for some time, with suggestions during the summer that the company was planning to badge disc drives and a printer, but that there would be no news until Maxwell decided what he wanted to do with Sinclair.

The announcement in August that Maxwell was withdrawing from the Sinclair takeover deal and that Sinclair had gained a massive order from Dixons, the high-street retailer, changed things again dramatically and took the company out of its takeover-imposed public limbo.

By the September Personal Computer World Show, the company had decided to halve the price of the QL to slightly less than £200. The new low-price QL moved off the shelf in thousands, warming the hearts of software vendors and add-on manufacturers alike.

Following the announcement that Sinclair had finally endorsed a set of disc drives for the QL and the evolution of the disc interface around the Tony Tebby standard, it should have been no surprise that the next great race would be to produce a hard disc for the QL and CST quickly ended competition for first place when it showed a working prototype at the Personal Computer World Show.

The price reduction to £199 also stimulated developments at the other end of the QL market, with a number of new arcade-type games from Microdeal, Eidersoft, Shadow Games and Psion. The stiffly-increased pace of QL sales also sparked rumours that big guns such as British Telecom would soon be moving into the QL software market, although we will have to wait until 1986 to see if that rumour bears fruit.

In the later weeks of 1985 Sinclair finally began shipping its badged printer — a Seiksha near letter-quality machine — for the QL and released a new collection of its own

entertainment software, some items of which are reviewed in the software section in this issue.

The question we must ask is which of these developments is most significant to our readers? There is a ballot form on which you are asked to vote for nominees in the First Annual QL World Awards for Excellence.

Categories

Best QL arcade game software. The winner in this section must be a hard-hitting, challenging game which requires fast reflexes, plenty of practice and the will to resist the temptation to have another crack at it every five minutes. We have suggested four possibles but you may denote any other nominees you think appropriate. Please remember, however, to tick only one box or your vote cannot be counted.

Best business software. Please select the package which most accurately answers a problem posed by the day-to-day operation of a business.

Best strategy game. Games which require planning and thinking as much as agility and skill. Some, like *Match Point*, need a good deal of both. Your job is to find the most challenging.

Best QL disc system. Which of the many new disc systems released in the last year for the QL best fits the bill so far as you are concerned?

Best RAM upgrade. Both internal and external RAM upgrades are now available for the machine. Please indicate which you think is the most elegant and affordable solution to the memory problem.

Most innovative new QL product. This is the best overall category and you can nominate any QL product, from modems to Microdrive holders.

When you have decided what you want to nominate in each of the categories, please complete the form, not forgetting your name, address and other details and send it to *QL World*. All replies must be received by January 31 and results of the voting will be printed in the March issue of *QL World*.

THE QL became something of an instant legend when it first appeared in February, 1983. It promised high-cost, high-performance computing power, 128K continuous RAM, multi-tasking, multi-windowing, four professional applications and two Microdrives, which were the strongest appeal to most potential customers. Independently described then as aggressively priced at £400, imaginations were captured and the waiting list grew — and grew.

The claim that Microdrives were unreliable gained credibility only because it was repeated so regularly. It appears in ever more colourful styles but is not explained or supported by evidence.

An article appearing in another publication describes a set of experiments designed to give an indication of Microdrive reliability. One error in excess of 18,000 file I/O operations was reported, showing reliability to be greater than 99.995 percent.

Continued on next page

BIRTHDAY AWARDS

Continued from previous page

In common with disc drives, user errors are the usual cause of data loss. Backing-up every stage of development is tedious and unnecessary. A good rule of thumb is to make a security copy only when the extra effort is offset by the inconvenience which would be caused if the data were to be lost.

Users complain that large Quill files which had not received attention for several months are frequently lost. If other files were written on to the same cartridge, it may be too full to create a temporary Microdrive file and "I/O incomplete" will be reported. Circumventing the proper exit procedures will leave a temporary file on Microdrive which may lead to similar problems. Large file handling which may lead to similar problems. It requires additional care and forethought.

The "Bad or changed medium" report indicates a genuine

failure, likely to be material damage to one or two tape sectors. Copying existing files and formatting the cartridge to mark the offending sectors "not for use" will enable the cartridge to be re-used with confidence.

QDOS is the magic behind the QL. The table shows that loading raw data from Microdrives is not slow. QDOS automatically maintains a sub filing system which frequently makes file I/O almost instantaneous by producing slave copies of Microdrive blocks in spare memory. Saving files as an independent job in that way frees the command processor within 2.5 seconds. Files are frequently scatter-loaded instantaneously, or within that time, from Microdrive and/or spare memory.

Loading long SuperBasic programs stored on Microdrive as standard ASCII source code takes longer because they are

compressed into double-byte addresses and single-byte codes when passed into Basic RAM during the short bursts of Microdrive activity.

Loading and saving data files via the Psion programs takes time, which is why Microdrives are considered slow. That fall in performance is largely due to Psion I/O techniques, designed for large business machines with fast disc drives. The programs are also large and leave no spare cache memory to utilise the sub filing system.

The QL, Microdrives and

Psion Suit work reliably and more than adequately, providing tremendous computing power for £200, but it is with extensive use of the Psion Suit that many users may find it convenient to expand their systems.

The QL is ideally-suited for this and offers several alternatives suited individually to specific requirements. Some people may wish to eliminate the need for temporary files with additional memory, while others may prefer to increase capacity and I/O speeds with disc drives. Some may wish to combine both.

Loading times for raw data

Machine	Drive capacity (K)	Data loaded (K)	Time sec.
Amstrad	180	39	15-16
Atari 1541	350	32	20
Atari ST	350	200	40
Commodore 1570	350	32	109
Commodore 1571	350	32	21
QL	110	78	7
BBC/Acorn	varies	32	8

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Manual dial V23 modem operating at 1200/75 baud and 1200/1200 baud half duplex.

Q-CALL

Provides traditional pulse/loop disconnect auto-dial and auto-answer.

BIRTHDAY AWARDS

1. Best arcade game software.

- QL Cavern
- QL Meteor Storm
- Lands of Havoc
- Zapper

2. Best business software

- QL Entrepreneur
- QL Integrated Accounts
- QL Cash Trader
- QL Home Finance
- Transact

3. Best strategy game

- QL Chess
- QL Reversi
- Super Backgammon
- Match Point

4. Best QL Disc system

- CST
- PCML
- Technology Rsrch
- Micro-Peripherals
- Silicon Express
- Cumana

5. Best RAM upgrade

- Silicon Express
- Simplex
- PCML

6. Most innovative new QL product

ANNUAL AWARDS BALLOT

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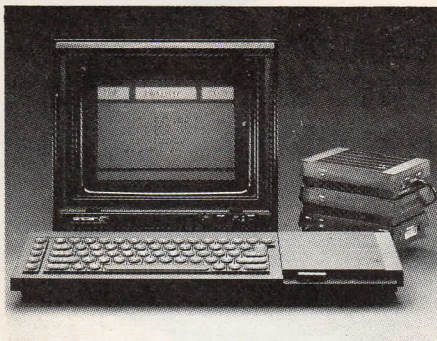
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On a separate sheet please write when you bought your QL, what peripherals you own for the machine and what add-ons you hope to buy in the next 12 months.

Post to: Awards, The Editor, QL World, Wells House, 80-82 Upper Street, London N1 0NU to arrive not later than January 31, 1986.

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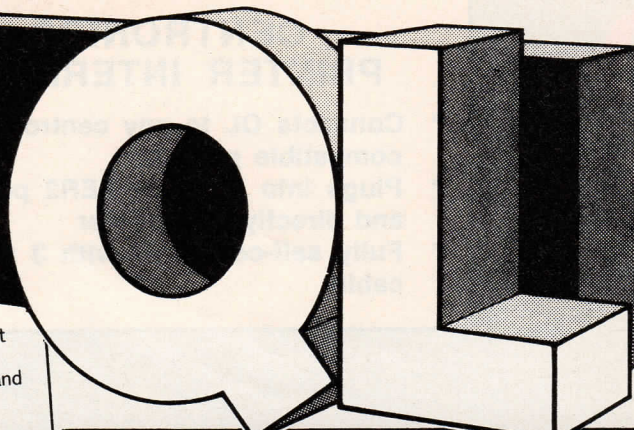
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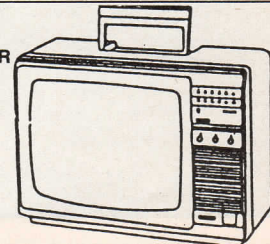
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Flexibility of spreadsheet use

PRESUMABLY if you are looking for a book about the Psion Abacus spreadsheet program for the QL you have already bought a QL. *Profiting from the Sinclair QL*, subtitled *Financial and Other Spreadsheet Applications*, by Barry Miles — Hutchison Computer Publishing, now called Century Hutchinson, £7.95 — makes no such assumptions. First it tries to sell you another QL in a pointless foreword and introduction to the QL series.

Next follows the preface and introduction proper, which addresses the weighty philosophical poser "Why should we use a spreadsheet?" It is a question which has been asked ever since the first spreadsheet appeared and the answer is that it gives us "true flexibility". Why flexibility? Because it allows us to change our minds, which is essential because we are capricious creatures seemingly incapable of logical thought.

None of those preambles make me feel

any smarter or even keen to learn to use the Abacus spreadsheet. The only incentive remaining is the fact that my spreadsheet is bundled with the QL and once you have cut through the uninteresting portions there is a useful guide to using the spreadsheet both for new and advanced users.

The first three chapters are an introduction to spreadsheets; the QL and its Microdrives, chapters four to 12, are concerned with operating the program; and the last two cover printers, daisywheel and dot matrix, and examples of specific real-life applications, both financial and non-financial.

On the plus side, the book uses photographs, albeit black and white ones rather than line drawings, to show exactly what will appear on your screens. It is a serious little tome which does little to emphasise the fun of learning to use your QL and its software — *Dave Selby*.

THE GENERAL attitude of publishers and software houses towards the QL has been to treat it as a business computer, not just a games machine. The QL is not the best-selling home computer on the market — although, with the recent price reduction, it is fast going that way — but it has had a number of books written about it and its bundled software. Two were published recently about Quill software alone.

The second, *Word Processing With QL Quill*, reached the market six months after the first, *Word Processing on the Sinclair QL*, one of The Sinclair QL Series.

Unfortunately, the earlier book describes the first versions of Quill used by a comparatively old QL. Renowned for unreliability and slow delivery, the first versions of the QL and the software accompanying them were different from packages on the shelf today. As a result, the earliest books suffered from confusion and admitted that their contents would become partly irrelevant and inaccurate in the future.

Longman waited until the QL was established before releasing David Dempster's book on Quill word processing. As a result, the book uses the latest version of Quill, 2.00, with commands now permanently used by the computer and its software.

Designed as a desk-top companion, the book has all the required ingredients, in a well-presented format, for word processing success, which is non-technical — and non-edible.

The author advises Quill users to read the QL Manual carefully, laborious though it is, before deciding if a supplementary book is necessary. Dempster's book reads more easily than the manual and develops new ideas for word processing methods.

The book can be used on three levels. Initial chapters deal with first principles for the beginner, while experienced computer operators with varying typing skills may start with later chapters. Experienced typists or word processor operators will find the appendices invaluable.

For the non-boffin computer user, it can take many hours to learn to set up and use complex software, particularly if it is poorly-documented. This book takes you through those stages in easy steps, presenting a basic grounding of word processing, describing its development through the ages from the Cavemen with PCs — Painted Caves — to the modern word processor with its various components.

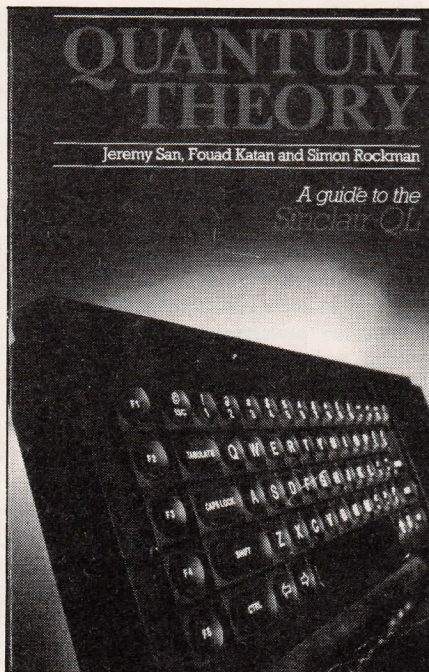
If you decide your frequent use of Quill warrants a supporting manual, this is the book for you. Costing £7.95, it will help those with neither the time or patience to cope with Quill.

Programming from Basic to working knowledge

ABOOK designed to take beginners with no previous computing knowledge through Basic programming to a working knowledge of how to program and use the QL is *Quantum Theory*, by Jeremy San, Fouad Katan, Simon Rockman — Century Communications, now called Century Hutchinson, £5.95. The authors have taken the approach of trying to involve the user, by diving straight in; by the second page of chapter one the novice has the machine running and is typing-in the first Basic commands. The book then takes you through the main Basic constructs, graphics, arithmetic, data handling, sound generation and even a start on structured programming and its techniques, using program examples throughout followed by explanation.

Only when the new user has assimilated all that do the authors consider the reader ready for a discussion of the operating system, Microdrives and communications, including file-handling, and passing extremely quickly through the QLAN networking and serial communications and machine code. An index of keywords and a two pages on care of the QL complete the book.

The authors have not been afraid to seek outside help, particularly for the nine-page explanation of sound generation, which details how to make the most of the limited abilities of the QL and provides a routine to permit tunes to be input in a sensible musical notation, converting them to the numeri-



cal format used by the machine. The book is on the whole sensibly laid out. The programming before technical explanation format is designed to encourage rather than to frighten users but perhaps the new user might like a glimpse of other uses and options for the QL in view of the attempts to get the machine into the business market. — *Mike Faden*.

Adventurers will find Pawn is

ONE OF the most recent games to appear for the QL is *QL Pawn* from Magnetic Scrolls Ltd, an adventure game to rival the comparatively long-standing *Zkul* and *West* from Talent Software.

Adventure games have always been a specialist subject in the software market and while the majority of games players own an adventure game of some description only a small percentage are fanatics.

Dedicated adventurers tend to scorn the intelligence of arcade games players but in fairness past adventure games have always been rather unfriendly. Using an adventure game for the first time was like talking to a foreign student who could not speak English. A large number of words are unrecognised and those which are have to be presented in a highly limited vocabulary. *QL Pawn* has changed that. Its emphasis is on sentence comprehension, so you talk to the computer in plain English sentences.

Having studied many adventure games for the QL and other micros, it is possible to see certain ideas incorporated into different programs. The most obvious, time-consuming and expensive is graphics, seldom used because of the severe limits placed on memory available for text.

Less structured

The other extreme involves a vast number of locations in the adventure, each described by a short, bland piece of text. That is to a certain extent the type of adventure which Talent games represent but the attraction of *West* and *Zkul* is the real time-scale incorporated into the adventure, as if it were you in each situation, not an imaginary character.

All adventure games have an eventual goal, achieved usually by visiting almost every location in the imaginary land and solving every problem which arises. Some games set riddles to crack, while others provide more tangible problems and dangers. Some will even give advice if you reach the end of your tether.

QL Pawn takes a less structured approach to adventure games. You are walking home from the supermarket carrying the week's shopping when a passing bearded scientist knocks you out and when awake the next morning you find yourself in another land and another time. It is then that the adventure begins.

The key is the silver wristband which now covers your forearm and steadfastly refuses to be moved. The gravel path on which you stand leads to the mountains and to your left and right are dying forests and vast grassy plains.

A set of unusually comprehensive instruc-

tions goes some way to describing the situation in this land and also demonstrates the unusual power of the program. *QL Pawn* allows full sentences to be entered and its vocabulary is extensive enough to allow free expression of your requests. An example sentence given in the manual is "Get all except the cases but not the violin case then kill the man-eating shrew with the contents of the violin case. Remove the shrew's tail and use it to tie the pole and the noose together".

QL Pawn lets you converse with any character, ask advice, purchase anything they offer, and so on. You will also be given tasks to accomplish for the characters.

Despite the sophistication of the game, trial and error still plays an important part in your success. If sentences contain words which are not recognised they will not be accepted. You will have to keep your wits about you; for instance, entering the shed in the palace grounds reveals various tools but it is only when you look specifically under the table that you find a flower pot.

In play, each new location has a title to describe your general position. That is very useful for mapping your routes and the positions of locations on paper, but beware, they are not on a grid and your movements are thus not entirely logical. At first, each title is followed by a full-length description of the location but on returning to the spot only the title is given.

All your advice must be gleaned from other characters. You can make a direct request for Help but the QL replies "How should I know — try tap dancing".

Having played the adventure for some time, you can recognise the extent to which the computer understands your commands according to its responses.

Hardened adventurers will find *Pawn* a delight to use, since it gives several assignments for you to achieve before you reach the final goal and it involves other speaking characters in your quiet little world of the unknown.

Meanwhile, newcomers to the sport will find the intelligence of the system allows freedom of speech and less frustration, therefore keeping them interested. As an adventure, *QL Pawn* was taxing and enjoyable to play but seemed limited in its number of locations. Its best feature, however, is the brilliance of the programming, which allows the player to input special commands as well as actions and conversation, and replies in intelligently. — *Jason Ball*.

Adventure challenge	★	★	★	★
Addictiveness	★	★	★	★
Documentation	★	★	★	★
Playability	★	★	★	★

SINCLAIR RESEARCH has taken the plunge and joined the budget adventure games market with a new release, *QL Classic Adventures*. Previously the company promoted areas for which little software was available but now, by producing *QL Classic Adventures*, it is competing with dedicated software manufacturers.

The first adventures for the QL were the highly-acclaimed *Zkul* and *West* from Talent software. They made use of the large QL memory and powerful processor and were significantly better than adventure games for other home computers.

QL Classic Adventures does not, however, make use of those facilities and consequently lacks their professionalism. You will receive a solitary Microdrive incorporating not one but two adventure games, both equally inferior.

The first is based on the famous adventure game by Crowther and Woods, the first of its kind, while the second is a loosely-related but original sequel. Documentation supplied is confined to the back of the box, so no details of the story are related.

Some instructions are included in the program but they are limited and cover only the basics of how to play. They also give some subtle clues. The first of the programs has always been a popular storyline and the program is interesting in that respect.

Unfortunately the intelligence of the original on which it is based has also been maintained, so the program is very basic in its understanding of requests from the player.

That has only one advantage — if you prefer to abbreviate all your commands — but can cause problems for inexperienced users; for instance, north-east must be entered as NE, or it is read as north.

Moving north into a room does not necessarily mean you enter it from the south. Roads are often curved, so moving north can



a delight

take you east, and so on. The adventure puts you in a forest from which the only escape is down — through a grating to the underworld.

Once you have entered the underground caverns, snakes, magic words and dwarfs all have to be contended with, and in some circumstances contested.

The text is clear but rather brief and suffers from one or two grammatical errors. It is also written in such a way that events happen before you are informed of them — “a dwarf threw an axe at you which missed”, it says, which does not give you much of a chance to dodge. Also the replies to commands do not distinguish between requests which are not understood or requests which are not possible under the circumstances.

The second adventure is called *Mordon's Quest*. Unlike its partner it is entirely original in its storyline but still suffers from a poor vocabulary and a severe lack of intelligence, using the same routines as the first program.

It is, however, more logical in its design, and suggests helpfully that you draw a map to trace your route. Initially you find yourself in a large house in the middle of an impenetrable mist. Your mission is to help the immortal Mordon, “oldest Lord of the many realities”, to find his stolen machine and keep reality a reality.

Having struggled for several hours to achieve a result, or at least to go somewhere interesting, I concluded that the name Mordon would be more appropriate without the ‘d’ — but that is all part of the fun.

In both adventures various objects are used to help you through the problems you encounter. Again the unprofessionalism of the program shows; although you can hold about eight objects at any time, each one has to be identified individually; you cannot say “take all”, as you can in other adventures.

In *The Adventure* those objects are present in certain rooms or caverns, while in *Mordon's Quest* they are locked initially in a cupboard and revealed only when you agree to undertake a mission assigned to you. Travelling from place to place is easy but the entertainment provided in each place is somewhat limited.

For those who have not tried this type of game previously, *Classic Adventures* might drive you to distraction. — *Jason Ball*.

● *QL Classic Adventures* is available for £9.95 from Sinclair Research by mail order or from good Sinclair retailers.

Playability	★	★
Adventure challenge	★	★
Addictiveness	★	★
Documentation	★	★
Overall Value	★	★

THE APPLE Macintosh has long been the king of the 68000 processor graphics computer business but the increasing number of draw packages for the QL are making it a serious low-cost alternative.

The QL, with its 85-column mode and high-resolution screen, now supports at least six professional graphics packages, the latest of which is *QL Draw* from Psion.

Commissioned originally to produce the business programs supplied with the QL — Quill, Archive, Abacus and Easel — Psion has also had success in the games market with such games as *Chess* and the recent *Match Point*. Those two games have given rise to the new graphics package, *Q Draw*, designed to create high-resolution pictures.

This is a no-frills package, developed originally to draw the superb graphics of *Chess* and *Match Point*. Pictures can be in high- or low-resolution and will complement artwork from other programs such as *QL Easel*.

There was no fancy picture to introduce *Q Draw* when I loaded it into the QL for the first time; all I was given was a blank screen with a cross in the centre. A picture is provided on the Microdrive which can be loaded to demonstrate *Q Draw* capabilities; players of *Chess* or *Match Point* will need no convincing.

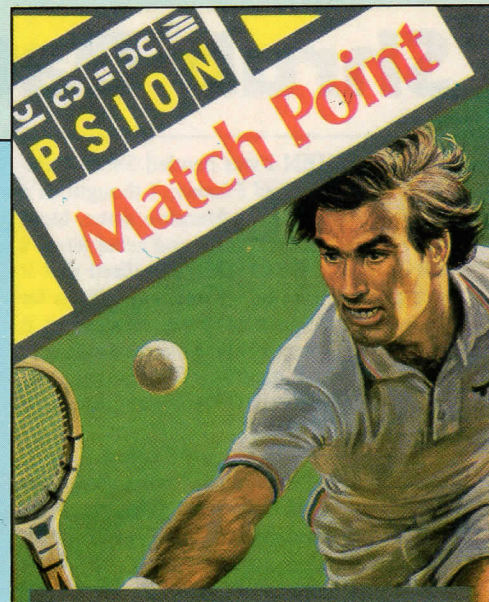
The 12-page manual accompanying my solitary Microdrive cartridge looked uninviting so I toyed with a cursor key instead. The cross in the centre of the screen leapt to life and moved a pixel to the left; and again. Further experimenting showed me how to draw a line by pressing the space bar and cursor keys intermittently.

Upper league

Tiring of scribbles, I turned at last to consult the instruction manual, which I found well-presented and easy to follow. It showed that *Q Draw* does not have the number of commands associated with costly packages such as the Talent GraphiQL but it can draw pictures pixel by pixel, which puts it in a league above most graphics programs for the QL.

The instructions revealed that the cursor should be moved using nine letters appointed for the task. The advantage of this system is in diagonal cursor movement — one key is used instead of pressing two cursor keys together. Unfortunately they are not placed symmetrically, so at first you press the wrong keys constantly and fly off in the wrong direction. That is simplified by using a joystick but, like the cursor keys, it suffers from an inability to draw diagonal lines.

The various commands for drawing are



Match Point gives rise to a new graphics package.

accessed by single keys, for example ‘K’ changes the cursor type, ‘L’ allows ‘rubber-band’ lines, and so on. That would usually demand frequent references to the manual until the corresponding letters were learned but in *Q Draw* the ‘F1’ key will produce a neat list of all the available commands.

Eight colours are readily available in high-resolution mode, four in low. Pressing ‘Return’ while drawing shows your current state of affairs in this department. Magnification is also available, a feature which was easy to use.

Great emphasis is placed on the ability of the program to move a shape once it has been defined by enclosing it with lines. That feature would be useful if, for instance, you drew a tree and a dog, and wanted to move the dog over to the tree — for obvious reasons. Pressing the ‘F4’ key produces a line which you use to encompass the dog. That shape can then be filled — if you do not like the dog or his habits; saved — if you do; moved, copied or even changed in colour.

Certain commands are accessed from a menu which appears when ‘F5’ is pressed. Those options allow pictures to be saved, loaded or erased, or a directory can be shown; each Microdrive can hold up to three pictures. You can also format a cartridge on which to save your masterpiece and the various printer drivers allow the screen to be printed at the press of a button.

Q Draw is fairly user-friendly, especially considering it was not developed for general use, and it can let you produce some excellent graphics.

Q Draw cannot turn you into a second Picasso unless you already are but it is great fun. — *Jason Ball*.

● *Q Draw* costs £14.95 and is available from Psion Ltd, Harcourt Street, London W1H 1DT.

Shrub Database is not a botani

WHEN I was handed *Shrub Database and Planner*, I thought of a botanical adventure game, laced with menacing herbivores and rebel ferns. I felt slightly deflated when I realised that it was a program to help you choose plants for your garden, house or office. Herb Wars it was not but, remembering a recent massacre of some of my plants, I felt the program might be able to teach me something about basic horticulture.

The program is on two Microdrive cartridges; one contains a databank listing facts about 287 various pieces of greenery, while the other cartridge holds the Psion Archive run-time module, used to access the databank, and seven plant programs. I started the program with the hope that my prize fig tree — which demonstrates an overwhelming desire to return to the compost heap because I cannot remember whether it likes the sun or not — would get a new lease of life.

I first discovered that you are not limited to the information already in Shrub Database. If you want to add or delete plant records, you can alter the database by using the Psion QL Archive database program. Shrub Database is written in the Archive programming language and is thus easily modified. That means, however, that your plant information will be limited to 20K. Unless you want to type-in the names of all the bushes in Kew Gardens, that amount should be sufficient.

Four choices

The main menu offers four choices — Selection, Display & Print, Re-set the Files, and Quit. As the latter three choices are self-explanatory, and limited in their function, it is the Selection menu with which you will spend most of your time working.

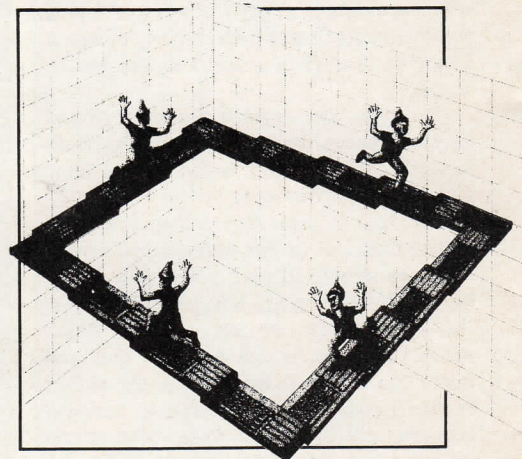
The Selection menu offers three specific plant programs. The first, called Enquiry, allows you to select a plant characteristic — such as a name, special needs or special features — and find all the plants in the database which have that characteristic.

The characteristics are pre-defined and given to the program via a collection of keywords, which are provided on an easily-accessed separate screen or in the documentation. Enter a specific keyword and the program will sort through its database. If your selected features are not found, the computer emits a sound resembling a sick foghorn and then returns to the main menu. If your features are found, the computer makes another noise which defies description and then returns to the main menu. This time, you press the letter “d” to enter the Display screen.

Another program in the Selection menu is Habitat, a temporary file, which selects plants to fit into a specific environment. You have to answer questions regarding your choice of type of plant — shrub, tree, conifer — the positioning of the plant in regard to the sun, the soil chemistry, moisture content, and soil type. You do not have to be a gardening expert to answer those, because the answers are provided on a multiple choice basis. You will, however, need a good deal of prior knowledge about your garden — the soil alkali, neutral or acid. Regrettably, Shrub Database assumes you already are well-informed about the state of your land.

Even though Habitat will tell you what kind of plant can grow in your environment, it will not tell you how to make your plot look like something out of *House & Gardens*. You still have to know whether a tree or a shrub would look better where you are planning to put it.

I asked Habitat to find a deciduous climber in the full sun and in neutral clay soil. The program took so long to sort through



the database that I could have dug a hole, planted a tree, watered it and watched it grow. It took the program an unimpressive three minutes to locate 19 types to fit my choice. For gardeners in the know, Shrub suggested I plant Japanese quince, Chinese gooseberry or clematis.

The last program in the Selection menu is

Integrated Accounts ends dilemma

MANY PEOPLE are tempted to put their business accounts on a QL but hesitate to do so because they feel either that an accounting program is too difficult to learn quickly, opting for the my-time-is-money approach to business, or that the computer may not be able to handle all their data—the my-data-is-bigger-than-your-storage-capacity school of thought. An accounting package from Sage-software should put an end to that dilemma.

QL *Integrated Accounts* is in a position to do so because it was the first QL program justifiably to make any kind of inroads towards easy swapping of data between one accounting task and another.

The perennial disadvantage of integrated packages—the more program information you put into the RAM the less space you have for your data—is addressed in this case by holding the various jobs to be integrated as separate sub-programs in the main *Integrated Accounts* program. That means that you have to load one program to post information into your accounts and another to draw up a report based on the information you posted. That also means, however, that the programs contained on the Microdrives

are that much more powerful and comprehensive because they are each allowed to occupy a whole cartridge.

QL *Integrated Accounts* arrives in the standard Sinclair business programs packaging, including a three-ring binder with 208 pages of documentation and an internal pouch for the Microdrive program cartridges. On those cartridges are the three programs—POST, used for recording cash and bank inputs and outputs; REPT, employed to make reports based on the figures calculated in POST; and UTIL, a series of utilities programs. The fourth is a blank data cartridge.

There must be a good deal of Microdrive cartridge-swapping if you are to integrate your data. The most obvious solution, although somewhat expensive, is to buy a single or dual disc drive. A disc drive would also circumvent the limited data storage capacity provided on Microdrive for an application as big as small corporate accounting.

First, you must consider the sheer number of transactions you conduct. A mathematical equation is provided by the package, which takes into account the memory necessary to run each program, together with how much remains to store data. An average is provided, based on 1,000 transactions of 76 characters each per each month—having, say, 100 sales accounts, 75 purchase accounts and 60 nominal or general accounts.

You should be able to store one month's

cal adventure

Planner, which picks plants by a specified characteristic and creates smaller temporary files of the plants with that particular feature. If you want it to have two particular traits, you have to use the Planner again. The Planner program offers 18 characteristics, ranging from common name to flower season, leaf colour, width and height. After you have made your selection, you can either display your choice or continue selecting.

Numbers limited

It should be mentioned that both Habitat and Planner, by setting-up temporary files you create, immediately limit the number of plants to which you have access. The program knows only about the plants you have selected, not all the plants in the database. You may be told that there is no single plant which can grow in clay soil but that is because you have not selected clay soil as one of your initial criteria. Unfortunately, that is not addressed clearly in the Shrub Database documentation and may lead some would-be gardeners to tear out their hair. To

re-set the program and return all the plants to the database, you have to press "r" in the main menu.

The Display menu, your second choice of the main menu, shows the information about your chosen plants in the following ways. Report — screen or print-out — lists all the facts about each plant chosen. The Name option will give you both common and botanical, while Feature lists special features such as nut-bearing capabilities and particular habitats, and Label offers a label format of plant names.

Shrub Databank struck me as being similar to a computerised menu planner — if you have the lamb and tomatoes, what will the computer suggest you cook? I could not help wondering if it would not be quicker to buy a gardening book with a good index and plenty of pretty pictures. With a book you control the flow of information — not with a computer.

It is also slower waiting for Microdrives to load than it is flicking through a book. I admit, however, that I am not an expert gardener and I will not quibble about the

validity of the information. You can obtain comprehensive information about 287 varieties of plants and you can tailor the database to your specific requirements.

I will, however, voice some concern about the price of the program. While the package admittedly includes two Microdrives, the packaging and documentation do not seem to warrant a £19.95 price. The documentation is far from lucid; the information is there but it is not well-organised. Two very small pages of how the program works is insufficient, particularly when you consider that half a page is used to describe the author's biographical details and material sources respectively.

You could buy a full-colour glossy gardening book at the price of the program which would probably answer most of your horticultural queries. It depends on how much of an outdoor gardening/computer fanatic you are. — *Yvette Stachowiak.*

● *Shrub Databank and Planner, Superplant Software, Llangeitho, Tregaron, Dyfed, Wales SY25 6QG. Tel: 097 423 223.*

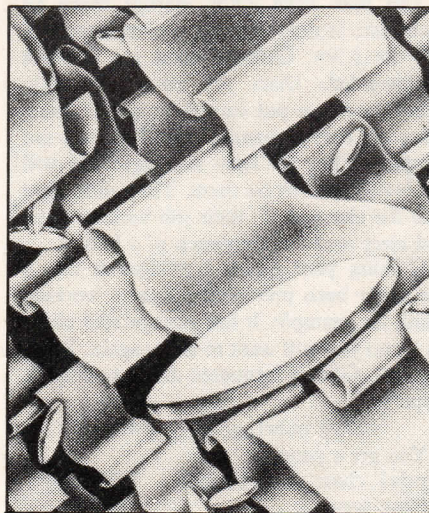
transactions on a single Microdrive cartridge. A quick run over the abacus reveals that you would then need 12 Microdrive cartridges—not including back-ups, which are strongly advised by the authors—for a year's accounts. On the other hand, if you have a disc drive, you can store up to 10,000 transactions on a single-sided floppy disc.

You start by setting-up the program with the Utilities program and define what type of system you are using—whether or not extra RAM is present, how much space is on your storage media. You cannot run the program without first using this utility, so do not try to use it without first defining your system — that warning is from personal experience.

Prompts for date

Once the program knows what kind of system it is talking, you run the Postings program and can begin setting-up your books. The POST program, like REPT and UTIL, is accessed by typing CRUN from the Integrated Accounts command line. It prompts you for the date, so that all data transactions can be date-stamped automatically and then moves you to the main postings menu.

You then decide the number of sales, purchase and nominal ledger accounts you will have, plus providing six control account numbers, e.g., Debtor's Control Number, Bank Control Number. The program will then initialise your new accounts and return to the main utilities menu.



After you have defined your accounts, you can make use of the sales ledger, purchase and nominal ledgers. To enter the sales ledger, you choose Sales Accounts to create new sales accounts. You then enter a six-character text reference number, account name and address. Whenever you refer to your new account, you enter that six-character reference name to save time.

A further set-up process is applied to sales invoices, sales credit notes and sales receipts. An account name will appear in the top left-hand corner. You enter the date, your invoice reference number, nominal account reference number—reference number for item or service will then appear automati-

cally under account name—short description of item or service, nett value, pre-set tax code number—T0 is zero-rated, T1 standard-rated, or use F3—tax rate, tax amount and batch total.

The same format is used for the purchase and nominal accounts ledgers, so you do not have to learn different commands or formats to enter various types of information. The Nominal Ledger, which is used for defining specific income and expenditure, requires a certain amount of care in setting-up. Nominal Accounts, for example, allows you to create reference numbers with relation to specific categories, e.g., 1234 might be the code number for cardboard box sales.

It is the reporting operation which comprises the second phase of using Integrated Accounts. The reports provide well-formatted output facilities for your sales ledger, purchase ledger and nominal ledger. It can also combine the three to produce management reports.

Of those reports, the management reports are probably the most exceptional. They offer day books, a tax return report—which can be used in calculating VAT returns—and an audit trail.

The package is well worth the £89.95 price and if the prospect of doing your company accounts normally sends you fleeing to the nearest cupboard, you would do well to buy a copy. — *Yvette Stachowiak.*

● *QL Integrated Accounts, Sagesoft Ltd, available directly through Sinclair Research or any Sinclair stockist.*

Loading Quill in nine seconds

I thought Quill 1.0 was a disaster area. Quill 2.0 is better but ultimately I found it was those two groaning Microdrives which stood in the way of further progress.

Now Quill with a disc drive? That is something else. Can you imagine Quill loading in nine seconds from the moment you press the Enter key? Can you imagine saving 4007 words in 33 seconds? Using my new Cumana disc system, I can. I have timed it with my stopwatch.

A week ago I would have thought that sounded like the spiel of a showground barker. Now I can assure you it is nothing less than the truth. I am completely entranced.

The Cumana system is in a smart black box to match the rest of the Sinclair équipe and works like a dream. For the peace of mind it brings, you would not know it was there.

I had not had a disc drive previously, so my adventures will interest fellow tyros. Read the book first. It is not the best publication for the complete beginner but it is the only one there is. So read it before you do anything else.

Disconnect all the power lines. Take out all the plugs from the back of the QL and then take off the extension port cover. That is probably the most difficult part of the operation. The point of a penknife near the bottom corners helps spring the two lugs from their sockets. Do not try to pull the handle — it is there only for effect.

Formatting cosy

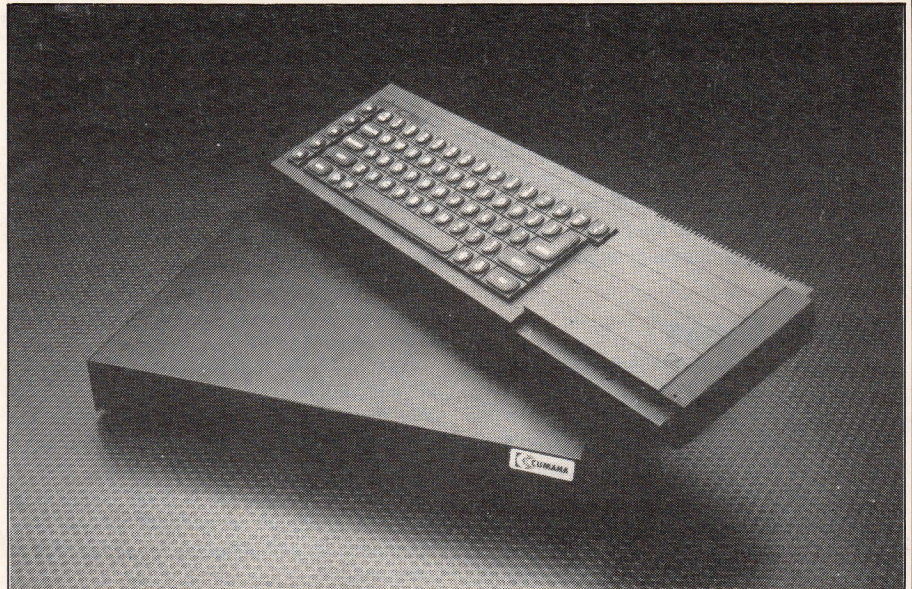
The Cumana floppy disc controller may be a tight fit. You know you are home when the green circuit board is out of sight. The connecting lead goes into place and clips easily into position, so long as you do not take the diagram too literally. Then you are almost ready to roll. Put both the leads in the QL. Power-up in the recommended order — monitor/tv, disc drive, QL. If there is no little red light glowing on the front of the disc drive, power down the QL and turn on the Cumana. There is a little switch at the back.

When you power-up the QL there is a green banner across the top of the screen, Cumana disc interface V1.14 copyright 1984. A moment later the regular Sinclair labels appear.

Formatting is easy. Take a disc. Hold it so you can see the arrowhead pointing towards the drive. Put a blank disc into each slot — they are drives 1 and 2 but mine are labelled 0 and 1. Type in:

```
format flp1_name (enter)
```

and in 90 seconds, no more, you get the



message

```
1440/1440 sectors.
```

It is as simple as that. Format flp2_ the same way.

You then have 720K storage space on each disc. It does not tell you so anywhere but the 3.5in. Cumana units are 80-track double-sided. Discs are about £4 each, which seems to put cartridges out of joint. They are easy to handle, too. They are not floppies. They are light and rigid and will not bend if you sit on them. They slide right into the slot and do their job without fuss, and eject easily at the touch of a button.

Cloning your Psion cartridges is like it has never been previously. Take a working Quill, for example. It has your printer codes on it and you will want to use it again. Put it in mdv1. Glide a formatted disc into drive 1. Type in:

```
wcopy mdv1_to flp1_ (enter)
```

You get a prompt:

```
mdv1_clonc to flp1_clone . . Y/N/A/Q?
```

Press letter a.

Two minutes later it is done. The last time I timed it with Microdrives it was six minutes 35 seconds.

If you want to check, dir flp1_ (enter) shows you have all the pieces of Quill safely on your first disc.

Put your second formatted disc into drive 2,

```
flp_use mdv (enter)
```

```
lrun mdv1_boot (enter)
```

and in nine seconds, Quill is there ready for use.

There are other ways of cloning Quill and its companions. Dig around in the *Cumana Disc Drive Guide* and you will find them there. That way it is easy. It does not involve

changing code and you can get back to Microdrive by entering flp_use flp.

Quill software with the Cumana is good enough to use without a RAM extension. The drives save whenever they need to without interrupting the flow of your thought. I have put more than 4,000 words into a document with none of the delays we all have from Microdrive Quill. The other Psion packages clone in the same way, on separate discs.

The only problem I have found so far is when I quit Abacus and try to load Quill via SuperBasic. I get an out of memory message. Psion Software Support tells me to ask Sinclair, Camberley, for Version 2.3 which avoids that situation.

I like the QJump clock with the Cumana interface. You enter flp_ext to get at the extra goodies. Enter clock and a little digital timepiece appears in a corner of channel 0. Set the clock with the usual Basic sdate 1985,10,25,14,3,36 or whatever and there you are. Sometimes the seconds stop ticking while the processor does something else. When they start again you still have the correct time.

Cumana gives you 30 of Tony Tebby's Toolkit commands. To list them all:

```
flp_ext (enter)
extras (enter)
```

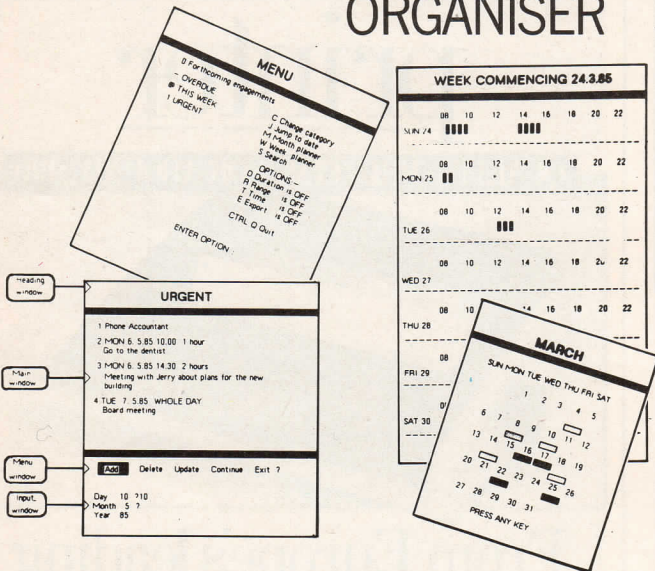
I like SPL — a spool command which lets me get on with something else while my printer produces devious words of wisdom.

The Cumana floppy disc controller retails at £82.95. Controller and single drive costs £189.95. With dual drive it is £279.95. Ten discs cost £39.95. Even the price is right. — *Francis Cameron.*

FROM



L.B.O. LIFE & BUSINESS ORGANISER



Gemini are pleased to announce the release of LBO for the Sinclair QL, a comprehensive life and business organiser package. This sophisticated and versatile program has been carefully designed to provide a wide range of very useful facilities, while still emphasising simplicity and ease of use.

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- Warning of clashing engagements.

Use LBO to organise your life from today until 1999! It can handle literally hundreds of multi-line messages, as many as you are ever likely to need. The system makes extensive use of the QL's windowing facilities making the system clear and easy to use.

Despite the wide range of facilities provided, this professional program is very easy to use and requires no knowledge of computers. A vital aid to your everyday life, LBO is actually fun to use!

ONLY £19.95 on Microdrive Cartridge.

Executive Adventure

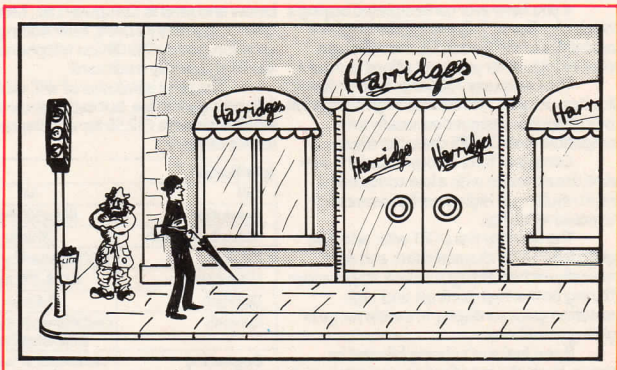
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There are over 140 rooms, and the program can understand a large vocabulary including multi-word phrases.

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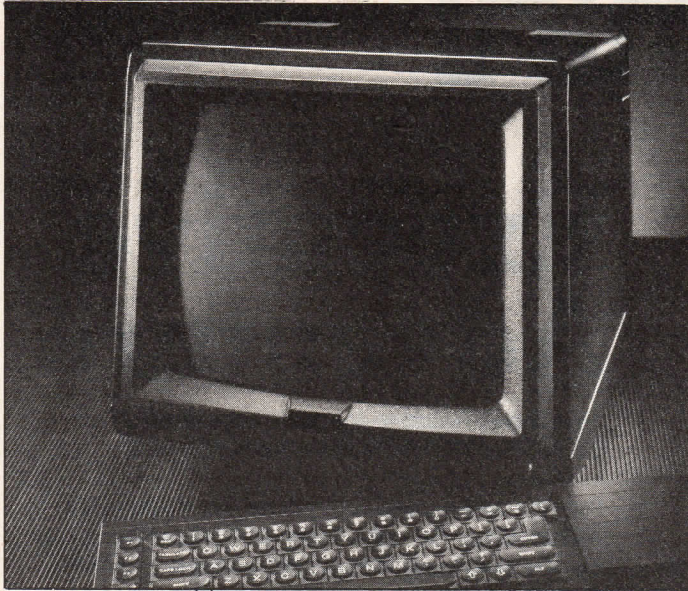
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Address _____

Cheque/POs value £ _____ enclosed, or please debit my Access/Amex no. _____

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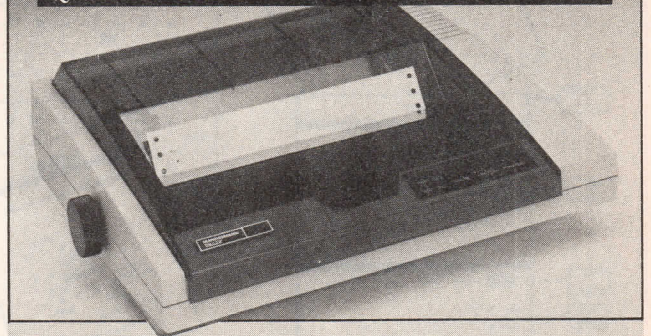
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Check if you need to register

USERS who keep personal data, such as club membership records, on their computers might not be aware that they probably fall under the aegis of the Data Protection Act. If the data is used only to produce sticky labels for addressing envelopes, they probably do not need to register under the Act. If any other information — such as the type of computer owned by a computer club member — is stored and use is made of that information for putting members in touch with one another, for example, registration will be necessary.

Failure to register by next May could be a criminal offence. All the necessary forms and information are available from main Post Offices. We will be registering Quanta when we have assimilated all that is contained in the paperwork. It will cost at least £22 to register, by the way.

Useful guide

Assembly language programmers will find the Motorola MC68000 programming pocket reference guide — M68000RGE/AD — very useful. Its 124 pages contain all the information needed by the programmer. If sufficient members are interested, we might negotiate a bulk purchase of the booklets with a Motorola distributor.

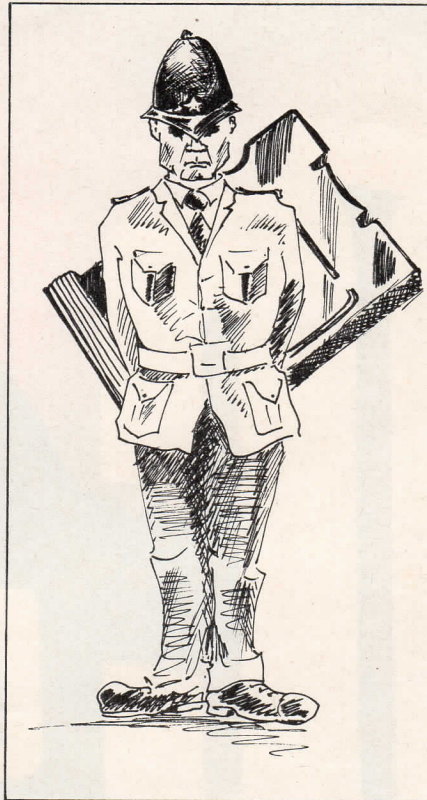
Quanta member A H Coppard has a useful tip if your machine is out of warranty and one of the Microdrives starts making what he describes as a harsh rubbing noise. The drive motor spindle has a rubber wheel on top of a plastic spacer and the noise results from a lack of clearance between the wheel and the spacer. The wheel is a push fit on the spindle and has only to be raised slightly to prevent the noise.

According to the service manual the clearance should be 0.25mm-0.5mm. You have to take the case apart, of course. With the standard repair charge of £40 for out-of-warranty machines, it might be worth trying if one of the drives begins to make a strange noise.

J W M Stone makes more room on his Quill cartridge by deleting the following files: QUILL←HOB, INSTALL←BAS, INSTALL←DAT and CONVERT←BAS. Those files are not needed when Quill has been set up for your particular requirements and you get another 71 sectors.

GST is now supplying a text editor rejoicing in the name of QED with its QC C compiler. Written in QC, it is very fast and, unlike most other text editors for the QL and Quill, can handle files up to the capacity of a cartridge or disc.

It makes full use of the windowing feature



of the QL, and has a built-in help facility. QED is available to previous purchasers of QC for £4.95 and anyone who wants only the editor can have it for £24.95.

Now that there is a great deal of interest in the C language, I feel that there is a need for a C Users' Group in the U.K. I have decided to form such a group along the same lines as Quanta. Please send a SAE to me at 65 Flanders Mansions, Flanders Road, London W4 1NF for information about the group.

Loading large SuperBasic programs can be speeded enormously by using a utility donated to the Quanta library by Wolfgang Goeller. The speeding is achieved by saving programs in tokenised form. SuperBasic programs take a long time to load because the keywords have to be converted into single-byte tokens as the program is loaded.

Motorola and Hitachi are collaborating in the development of a CMOS version of the 68000. CMOS devices take a fraction of the power required by NMOS devices such as the standard 68000 and 68008, so we might see a new generation of very powerful portable computers before long.

PCML recently sent me one of its Q+ disc interfaces. It can handle up to four drives and has 256K of RAM in the same module. It is supplied with software in EPROM written by Tony Tebby. All the

usual toolkit functions are provided and there is the useful feature of a RAMdisc. Up to eight RAMdiscs may be specified.

Some of you might not have met the term RAMdisc previously. The idea is that one or more portions of memory are treated like a disc drive by the operating system. Before use, a RAMdisc must be formatted by a command like:

```
format RAM1-200
```

which will create a RAMdisc of 200 512-byte sectors; that is with a capacity of 100K. The RAMdisc may then be treated just like any other storage device. For instance, to transfer a file called fred_doc from a floppy disc to RAMdisc you type `copy flp1_fred_doc,ram1_fred_doc`.

RAMdiscs are especially useful with programs which use overlays, like Quill with its help files, and certain compilers, as files can be transferred between RAMdisc and memory much faster than between floppy and memory.

Since files are held in RAM with a RAMdisc, switching-off the machine will mean that the files are lost, so a little care is needed when using them.

Seismic network

A RAMdisc facility is also very useful if you have only one disc drive, as it makes the transfer of files from one disc to another very easy — just copy them to the RAMdisc, swap discs, and copy the files from RAMdisc to the new disc.

Davor Pavuna, one of our members in France, tells me that the graphics laboratory at the University of Grenoble has bought 50 QLs which will form a network of stations for seismic surveys. Some interesting software should result from the project.

At any future Quanta group meetings, participants will be required to sign an undertaking that they will not make unauthorised copies of commercial software or permit such copies to be made. If any member is found to be indulging in piratical practices, they will be expelled from the meeting and their membership revoked.

We have an excellent relationship with many software houses, which we do not intend to jeopardise. Software is now protected by copyright and unauthorised copying is illegal.

An interesting technique has been adopted by Simon Goodwin, author of the SuperBasic compiler sold by Digital Precision. A code has to be typed-in before the program will run and the code can be found only by the use of a special lens provided with the package. The pixels are scrambled on the display and can be unscrambled only by the use of the lens. — Leon Heller.

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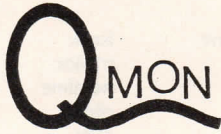
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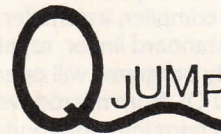
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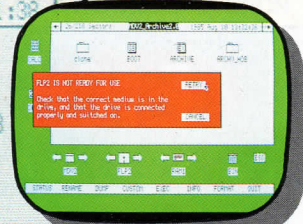
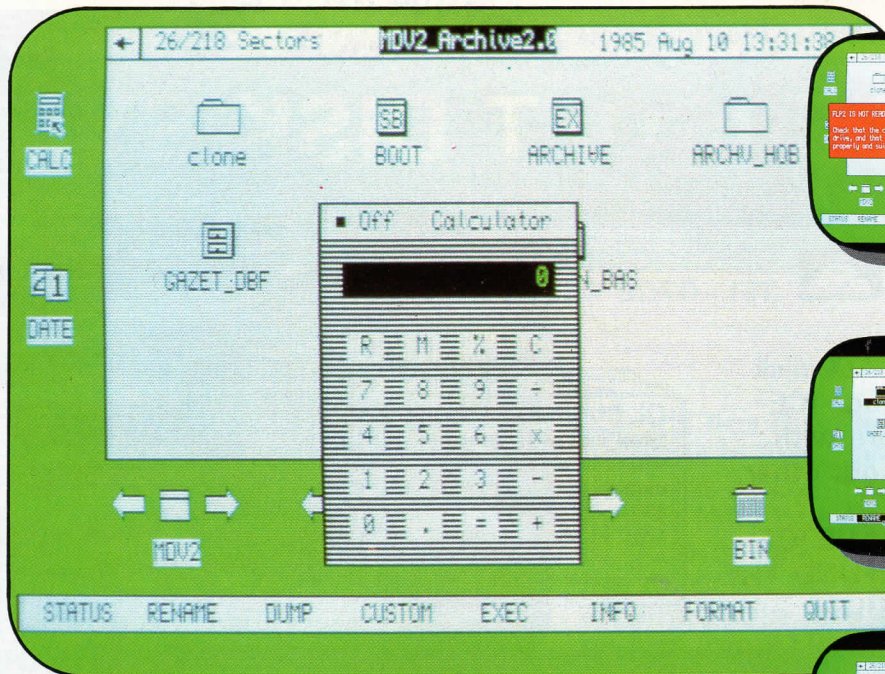
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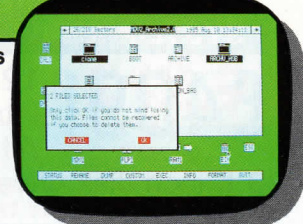
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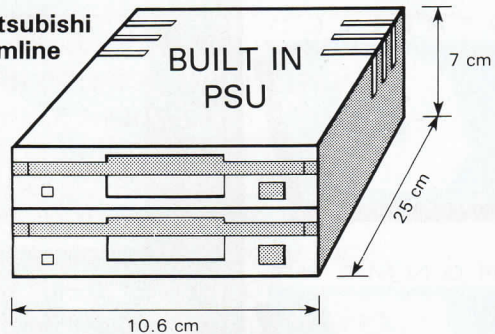


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QL User Dec 1985

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